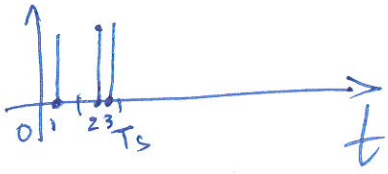
① Pulse Position Modulation

11/06/2019

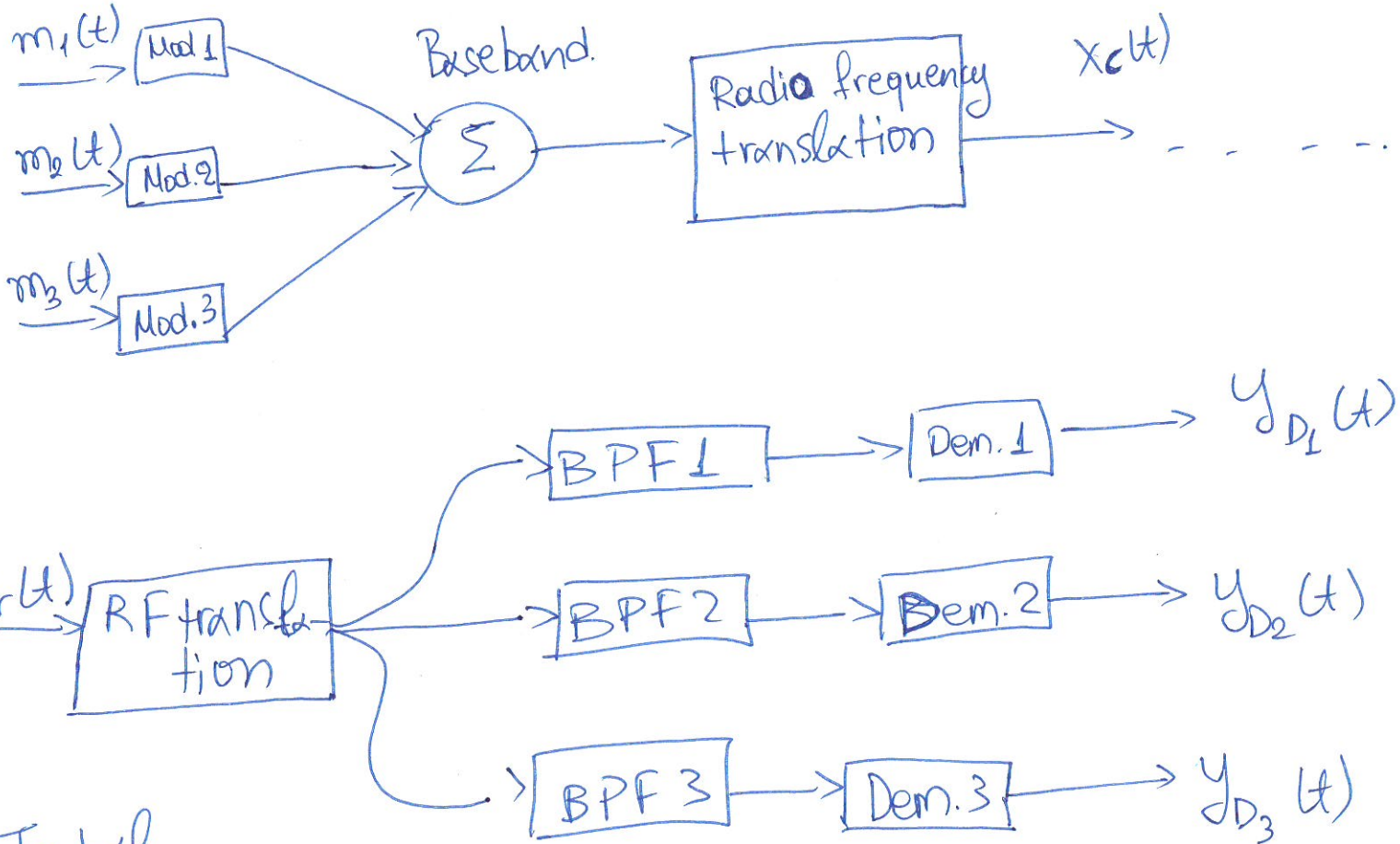


$$x(t) = g(t - t_n)$$

t_n ↑

↓ shape of pulses

Multiplexing

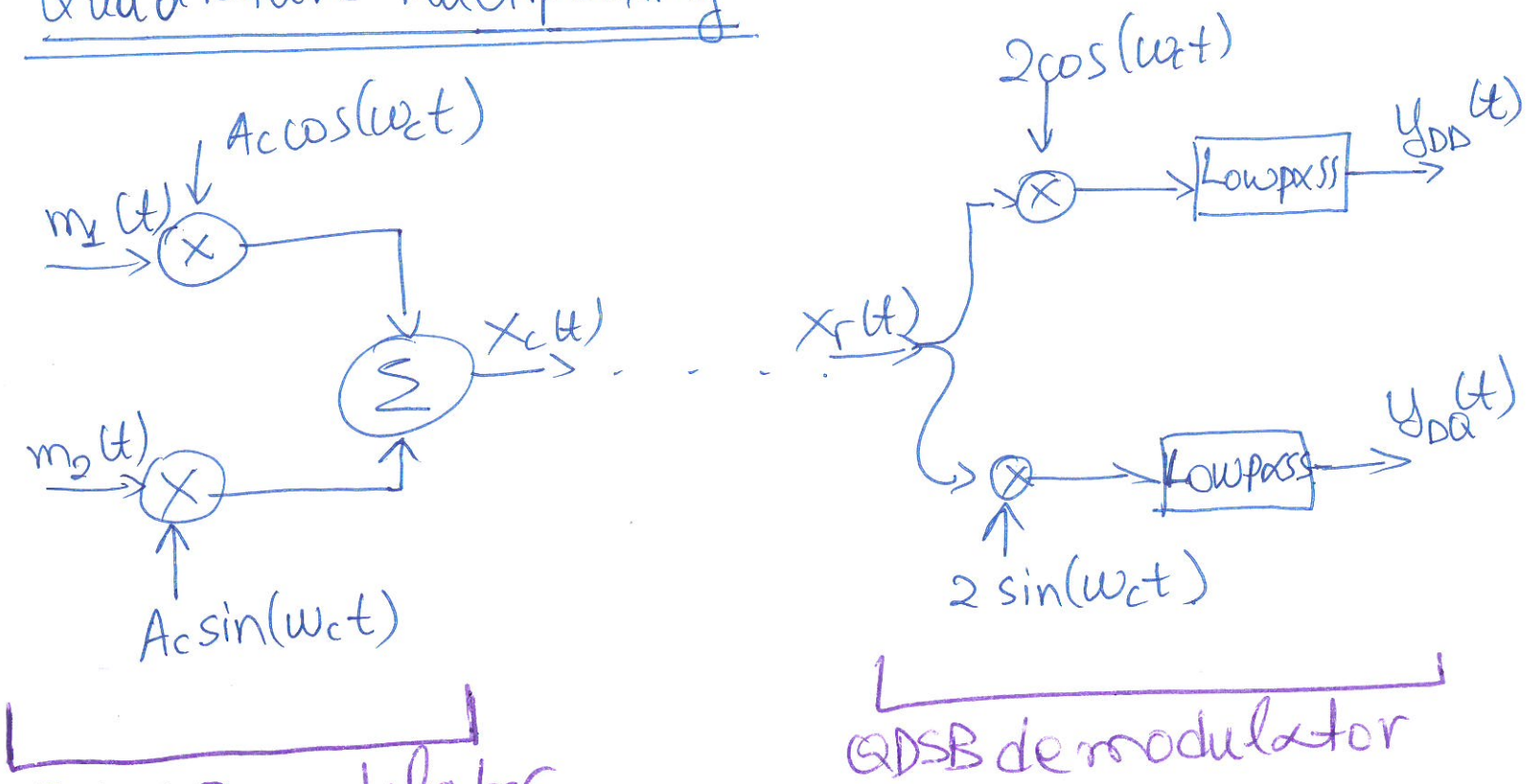


Total Bandwidth

$$B = \sum_{i=1}^{N} W_i + \text{Bandwidth of the guard bands}$$

$\sum_{i=1}^{N} W_i$: bandwidth of message signals

Quadrature Multiplexing



$$x_c(t) = A_c\left[m_1(t)\cdot\cos(\omega_c t) + m_2(t)\cdot\sin(\omega_c t)\right] = x_r(t)$$

$$2\cos(\omega_c t)\cdot x_r(t) =$$

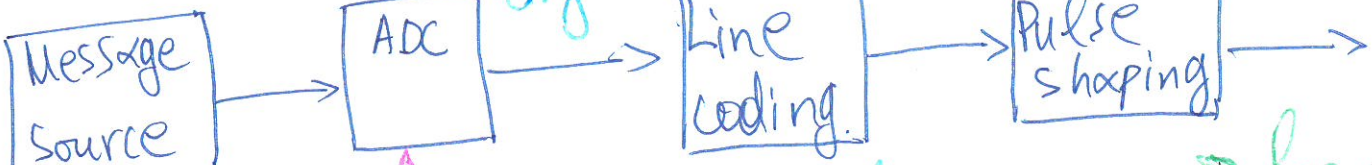
$$= A_c\left[m_1(t)\cdot\cos\theta - m_2(t)\cdot\sin\theta\right] +$$

$$+ A_c\left[m_1(t)\cdot\cos(4\pi f_c t + \theta) + m_2(t)\cdot\sin(4\pi f_c t + \theta)\right]$$

Lowpass filter

$$y_{DD}(t) = A_c\left[m_1(t)\cdot\cos\theta - m_2(t)\cdot\sin\theta\right]$$

m(t)



message signal.

only in the case that my original signal is analog

→ spectral shaping

→ synchronization

→ bandwidth limits

→ for more efficient transmiss and based on line coding yo want to sha our pulses

e.g.